

Nutrition Therapy Recommendations for People with Diabetes

National Diabetes Education Program Quarterly Webinar Series

Thursday, March 20, 2014
2-3 PM ET



National Diabetes Education Program

A program of the National Institutes of Health and the Centers for Disease Control and Prevention





Webinar Logistics

- All lines are muted
- Two ways to ask questions during Q&A period:
 1. Type your question into the question section and we will read your question aloud.
 2. Click the “raise hand” icon and we will call your name and unmute your line allowing you to ask your question.



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Presenters

Marion J. Franz, MS, RDN, CDE

Nutrition and Health Consultant with Nutrition Concepts by Franz, Inc.

Joanne Gallivan, MS, RD

Director, National Diabetes Education Program
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Nutrition Therapy Recommendations for People Managing Diabetes

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Webinar Goals

- Review highlights of the American Diabetes Association (ADA) 2013 Nutrition Therapy Recommendations
- Provide evidence for the effectiveness of diabetes nutrition therapy
- Review the role of weight loss interventions in adults with type 2 diabetes
- Summarize ADA 2013 nutrient recommendations
- “Take Home” message



Polling Question: Which is an accurate statement for weight loss (WL) in adults with or at risk of T2DM?

1. WL improves glucose throughout the progression of T2DM.
2. WL is most effective in prediabetes or early after diagnosis.
3. Low carbohydrate diets are preferred for weight loss.
4. Low fat diets are essential for weight loss.



Polling Question: Which is the most accurate statement regarding carbohydrate (CHO) intake for persons with diabetes?

1. Fiber intake improves glycemic control.
2. High GI foods are absorbed into the blood stream rapidly.
3. Total kcal more important than total CHO for glucose control.
4. Adding protein to CHO snack slows absorption of CHO.



Is Diabetes Nutrition Therapy Effective?

- Prediabetes outcomes
 - Nutrition therapy along with physical activity ↓ risk of type 2 diabetes by 58%; maintained up to 14 yrs
- Diabetes outcomes
 - Nutrition therapy provided by RDs: ave. ↓ in A1C 1% to 2% (ranging from 0.5 to 2.9%) depending on type, duration, and level of control of db
 - LDL-C ↓ by 15-25 mg/dl or by 7-22%
 - SBP and DBP ↓ on average by ~5 mmHg
 - Outcomes known by 6 weeks to 3 months

Knowler et al. *Lancet* 2009;374:1677; Evert AB, et al. *Diabetes Care* 2013;36:3821; Acad Nutr Diet. EAL.www.andevidencelibrary.com, Pastors, Franz. *ADA Guide to Nutrition Therapy for Diabetes*. 2012;1-18, Appel et al. *JAMA* 2004;289:2083.



Type 2 Diabetes and Nutrition Therapy: Examples

- Findings from RCTs, observational studies, systematic and Cochrane reviews demonstrate effectiveness of nutrition therapy; examples:
 - UKPDS (United Kingdom Prospective Diabetes Study): Newly diagnosed; A1C 9%; 3 mo, A1C ↓ 2%
 - Early ACTID (Early Activity in Diabetes): Newly diagnosed; A1C 6.7%; 6 mo maintained to 12 mo, A1C ↓ 0.4% ($P < 0.001$), even with use of fewer diabetes drugs
 - LOADD Study (Lifestyle Over and Above Drugs in Diabetes): Ave duration of db: ~9 yrs; hyperglycemic despite optimized drug therapy; A1C ↓ 0.5% vs control ($P = 0.007$); comparable to adding new drug; cost-effective
- Due to progressive nature of T2DM over time pharmacotherapy is needed but nutrition therapy continues to be essential

UKPDS. *Lancet* 1998;352:854; Andrews et al. *Lancet* 2011;378:129; Coppel et al. *BMJ* 2010;341:c3337; Evert et al. *Diabetes Care* 2013;36:3821



Type 1 Diabetes and Nutrition Therapy: Examples

- FIIT (Flexible Intensive Insulin Therapy) Using Insulin-to CHO Ratios
 - Dose Adjusted for Normal Eating (DAFNE): A1C ↓ 1% with no increase in severe hypoglycemia and quality of life improved; 44-mo follow-up: continued improvement in A1C and quality of life
 - Training programs in Germany (3-yr) and Australia (1-yr): improvements in A1C without increasing risk of hypoglycemia
- For individuals on MDI or insulin pumps, insulin does adjusted based on planned carbohydrate intake
- For individuals using fixed daily insulin doses, CHO intake should be consistent (time and amount)

DAFNE Study Group. *BMJ* 325:746, 2002; Speight. *Diabetes Res Clin Pract* 89:22, 2010; Lawton. *Diabetes Res Clin Pract* 91:87, 2011; Samann. *Diabetologia* 48:1965, 2005; Lowe. *Diabetes Res Clin Pract* 80:439, 2008; Evert et al. *Diabetes Care* 2013;36:3821



What Nutrition Therapy Interventions Are Effective?

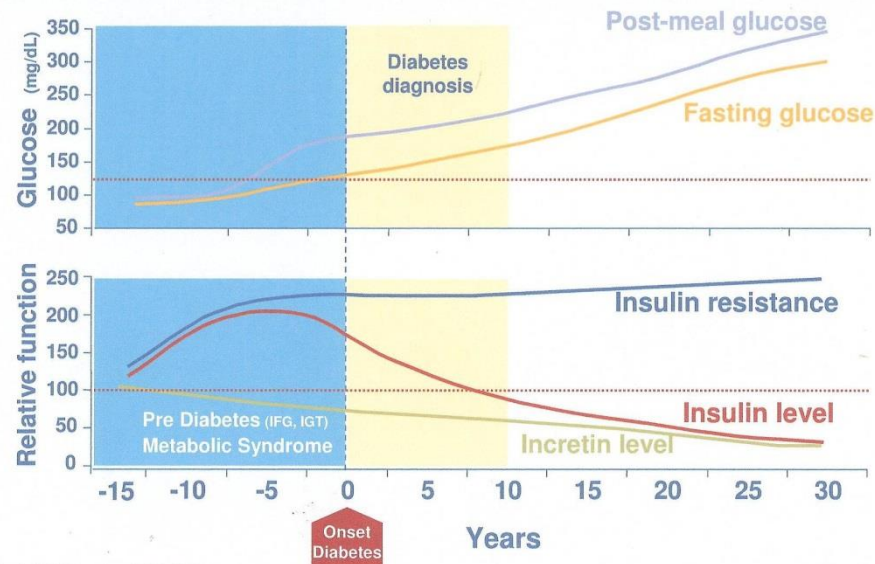
- A variety of nutrition therapy interventions, such as reduced energy/fat intake, carbohydrate counting, simplified meal plans, healthy food choices, individualized meal planning strategies, insulin-to-carbohydrate ratios, physical activity, and behavioral strategies
 - Type 2 db: reduced energy intake
 - Type 1 db: matching insulin to CHO intake
- A number of initial individual or group sessions and follow-up encounters were implemented



Type 2 Diabetes: A Progressive Disease

BG remains normal until insulin deficiency

Natural History of Type 2 Diabetes





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Type 2 Diabetes: A Progressive Disease

**Prediabetes:
Insulin Resistance**

**Onset Diabetes:
Beginning of
Insulin Deficiency**

**Diabetes: Insulin
Deficiency**

Nutrition Therapy

**Lifestyle
Interventions**

**Nutrition
Therapy Alone
or
with Medications**

**Nutrition Therapy
Medications
Insulin**

Meds

Franz. *Am J Lifestyle Med* 1:327, 2007



The Dilemma of Weight Loss in Diabetes

- “Diet” doesn’t fail—the beta cells of the pancreas fail
- Insulin resistance
 - Modest amounts of weight loss (and physical activity) can prevent or delay type 2 diabetes
 - Weight loss may improve risk factors
- Insulin deficiency
 - Focus is on nutrition strategies for normalization of blood glucose levels, lipids and blood pressure
 - Results on glucose will be known by 6 weeks to 3 months



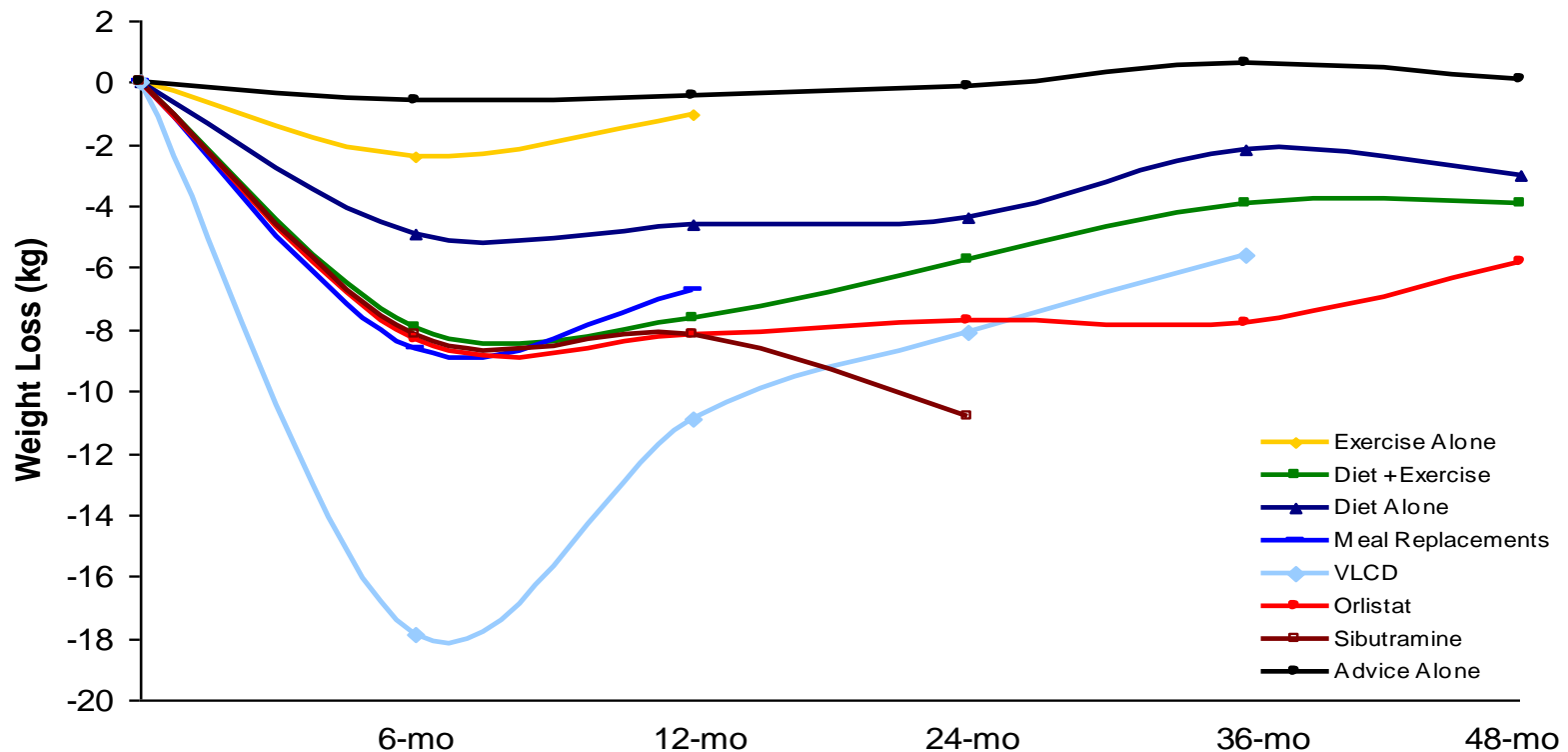
What is Known About Weight Management?

- At ~6 months individuals can lose 5% to 10% of their starting weight
- Regardless of the intervention, plateaus and regain of weight loss are expected; compensatory mechanisms protect against weight loss
- If treatment is discontinued, weight gain occurs
- With support, modest weight loss can be maintained



Average Weight Loss Per Subject Completing a Minimum 1-Yr Intervention

80 studies; 26,455 subjects; 18,199 completers (69%)





Why Weight Loss Is Difficult?

- Genetics - ~50% of variance genetics and 50% environment
- Weight tightly regulated by neural, hormonal, and metabolic factors
 - Hormonal adaptations (↓ leptin, peptide YY, cholecystokinin, insulin, and ↑ ghrelin, gastric inhibitory polypeptide, pancreatic polypeptide) that encourage weight gain after diet-induced weight loss remain 1-yr after initial weight reduction
 - Weight loss results in adaptive thermogenesis (↓ resting metabolic rate) up to 1-yr

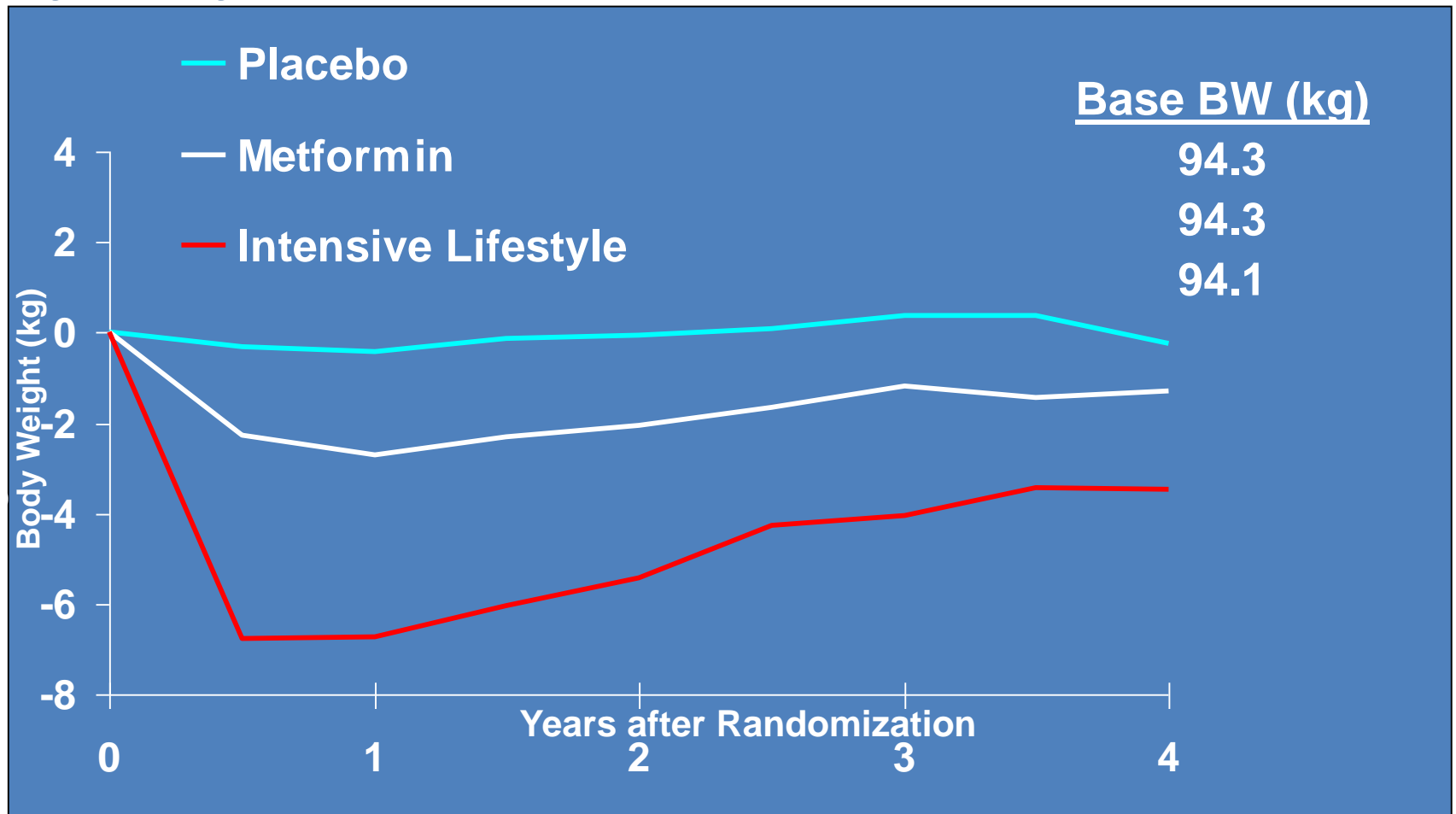


What Are the Benefits From Modest Weight Loss (~5% of Initial Weight)?

- Prevention or delay of type 2 diabetes
- Decreases in systolic and diastolic blood pressure in dose-dependent fashion
- Decreases in circulating inflammatory markers (C-reactive protein and cytokines)
- Potential improvement in triglyceride levels, total and LDL cholesterol



Change in Body Weight and Prevention/ Delay of Type 2 Diabetes



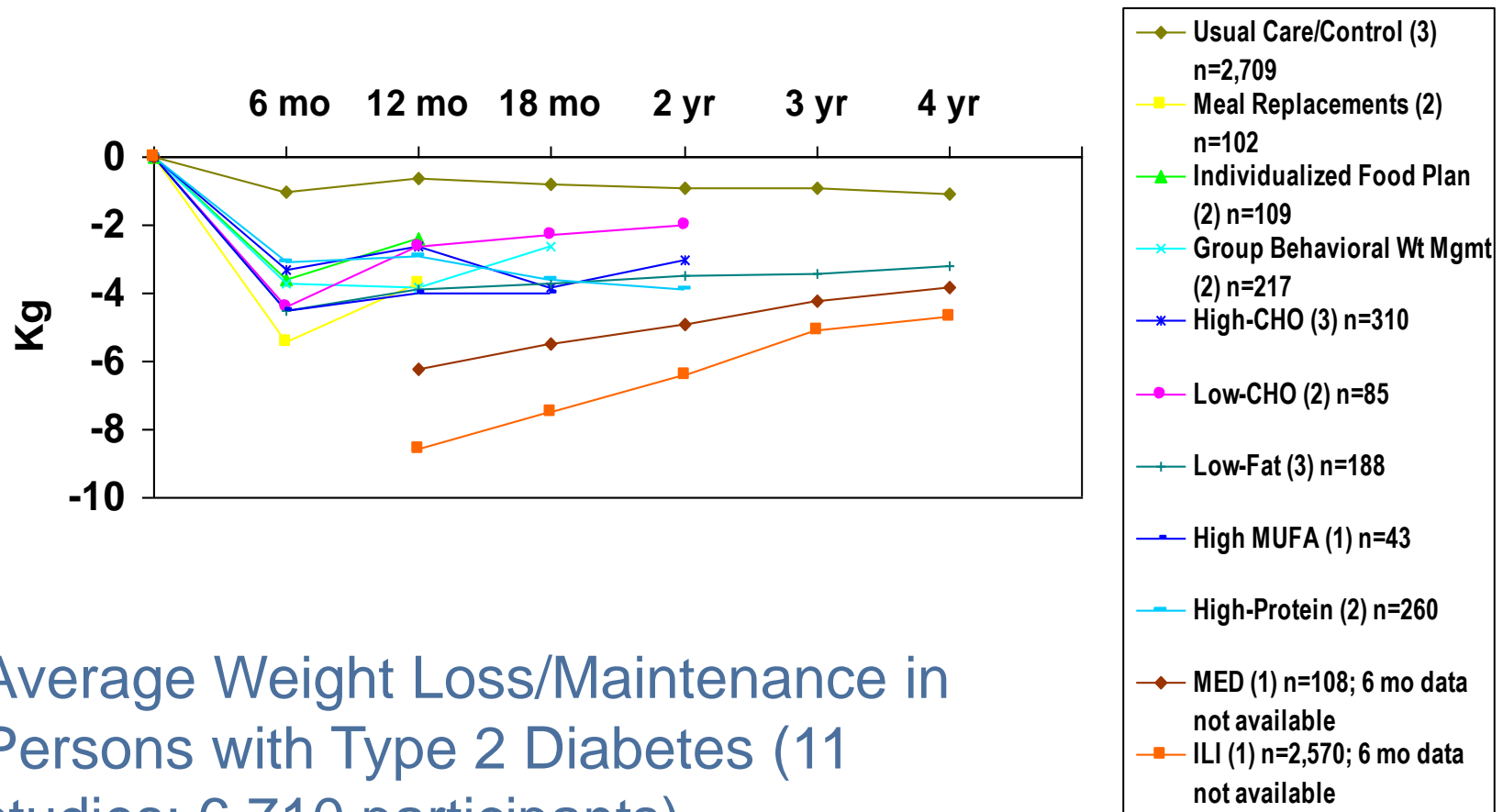


Weight Loss Intervention Studies in Type 2 Db

- Systematic Review: 1-yr study duration; 70% completion rate; 2000 to 2013
- 11 studies (5 >1-yr): 8 compared weight loss interventions (WLI) and 3 compared WLI to usual care or control (19 WLI groups)
- Weight, A1C, lipid, and BP effectiveness
- Weight losses 1.9-8.4 kg at 1-yr
 - 17 interventions -1.9 to 4.8 kg
 - Mediterranean-style -6.2 kg; ILI -8.4 kg
 - Low carbohydrate -1.9 kg



Weight Change Outcomes



Average Weight Loss/Maintenance in Persons with Type 2 Diabetes (11 studies; 6,710 participants)



Systematic Review cont.

- 8 WLI improved A1C at 1-yr
 - Meal replacements, behavioral at 12 mo but not at 18 mo; high CHO, high protein, low-fat, MED, ILI
 - 3 with PA: MED ↓ 1.2%; ILI ↓ 0.6%; low-fat ↓ 0.6%
- 11 WLI reported NS changes in A1C at 1-yr
 - Individualized food plan; soy-meal replacement; high-MUFA; high-CHO; low-fat; high-protein
- Majority NS changes in lipids (10 ↑ HDL)
- 7 WLI improved BP; 7 NS changes in BP



Systematic Review cont.

- 5 studies compared macronutrients (all reported similar weight changes)
 - High MUFA vs high CHO (-4.0 vs -3.8 kg)
 - Low CHO vs low fat (2) (-3.1 vs -3.1 kg; -1.9 vs -3.9 kg)
 - High protein vs high CHO (2) (-3.2 vs 2.4 kg; 2.2 vs 2.2 kg)
- 8 WLI reported NS changes in A1C from baseline at 1-yr; 2 (1 high-protein, 1 high-CHO) reported improvement (-0.2%)



Why doesn't weight loss always lead to improved glycemia?

- Usual weight loss therapies do not lead to adequate weight loss

OR

- Persons are primarily insulin deficient—need medications to be combined with nutrition therapy

OR

- Energy restriction leads to improved glycemia, not weight loss per se



Carbohydrate

- There is no ideal percentage of calories from carbohydrate, protein, and fat for all persons with diabetes; all 3 require insulin for metabolism
- Total energy intake is more important than the source of the energy
- Monitoring carbohydrate intake, whether by carbohydrate counting or experience-based estimation, remains a key strategy in achieving glycemic control



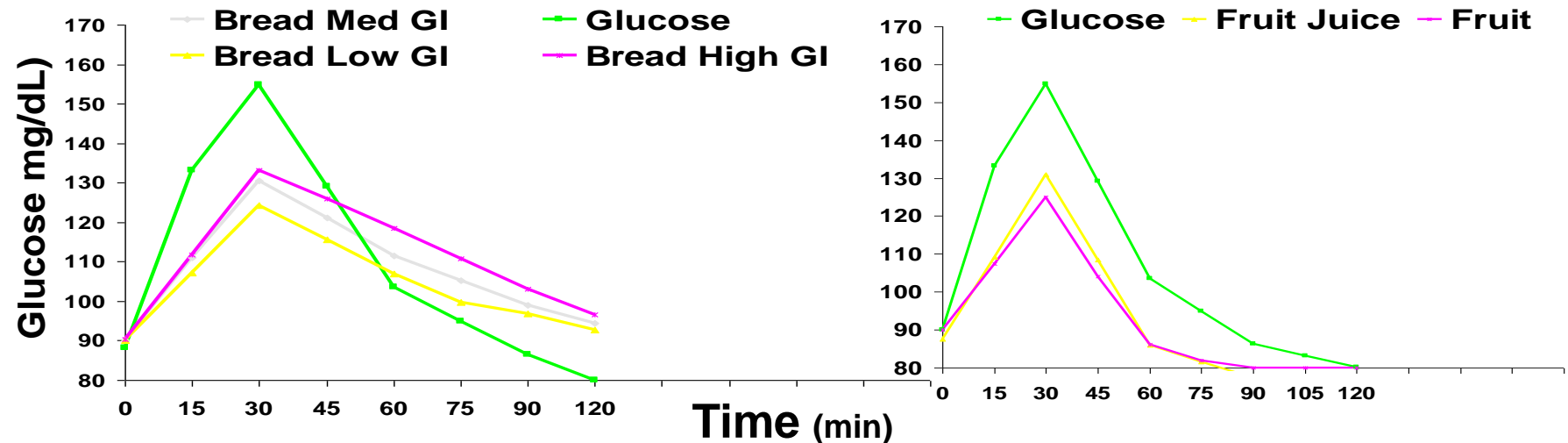
Carbohydrate Intake

- Most individuals with diabetes do not eat a low- or high-CHO diet, but rather a moderate intake of CHO
 - CHO: ~45% of total kcal
 - Protein: ~16-18%
 - Fat: ~35-40%
- For the majority of individuals with diabetes it appears difficult to eat a high CHO diet
 - In the UKPDS, despite education to eat 50% to 55% of kcal from CHO, average intake was 43%



Glycemic Index: The GI Does Not Measure How Rapidly BG Increases!

The GI is the relative area under the postprandial glucose curve (AUC) comparing 50 g of digestible carbohydrate from a test food to 50 g of glucose



“No statistical difference in the glucose response curve from different foods...Low GI foods do not produce a slower rise in BG nor do they produce an extended, sustained glucose response.”



GI Summary

- Two 1-year RCT of low GI diets reported to differences in A1C
 - Canadian Trial of Carbohydrates in Diabetes: compared high-GI/low GI; low-CHO/high MUFA; no significant in A1C, lipids or body weight
 - Low GI vs. ADA diet: similar reductions in A1C at 6 and 12 mo
- ADA Macronutrient Systematic Review
 - In general, there is little difference in glycemic control and CVD risk factors between low GI and high GI or other diets; slight improvement in glycemia from lower GI diets confounded by higher fiber intake



Carbohydrate: What's Important?

- Although all CHOs can be eaten, for good health, CHOs from vegetables, fruits, whole grain, legumes, and dairy products take priority over CHO foods that contain added fat, sugars, or sodium
- Limit or avoid intake of sugar sweetened beverages (from any caloric sweetener including high fructose corn syrup and sucrose) to reduce risk of weight gain and worsening of CVD risk
- Macronutrient proportions should be individualized and adjusted to meet metabolic goals and individual preferences of the person with diabetes



Protein

- In persons with type 2 diabetes, ingested protein does not increase plasma glucose levels but does increase insulin response
 - Protein should not be used to treat hypoglycemia or to prevent hypoglycemia
- In persons with normal renal function, usual protein intake (15-20%) does not need to be changed
- In persons with DKD (either micro- or macroalbuminuria), reducing protein is not recommended as this does not alter the course of the GFR decline



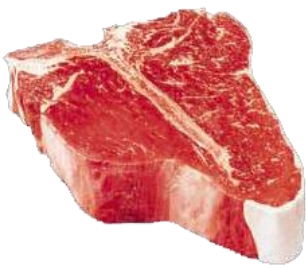
Protein Summary

- Protein does not need to be added to snacks or meals
 - Does not slow or change carbohydrate meal or snack glucose response
- Protein is not helpful in the prevention or treatment of hypoglycemia
- For persons with DKD (micro- or macroalbuminuria) reducing protein below usual intake is not recommended because it does not alter glycemic, CVD, or the course of GFR decline



Fats and Diabetes

- In animal and observational studies, higher intakes of total dietary fat, regardless of the fat type, produce greater insulin resistance
- In clinical trials saturated and *trans* fats shown to cause insulin resistance, whereas mono- and polyunsaturated and omega-3 fatty acids do not have an adverse effect
- Evidence inconclusive for ideal amount of total fat; fat quality more important than quantity





Individualization Is Essential

- Individuals with diabetes eat foods, not single nutrients
- *Healthy eating or healthy eating patterns* emphasizing a variety of nutrient-dense foods in appropriate portion sizes continues to be the first goal of diabetes nutrition therapy
- Must address individual nutrition needs based on personal and cultural preferences and the individual's willingness and ability to make behavior changes

What's the best nutrition therapy intervention for diabetes?



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National Institutes
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In an “Ideal” World

- People with type 2 diabetes:
 - Lose 5% to 10% of baseline weight
 - Eat a nutrient dense eating pattern in appropriate portion sizes
 - Participate in 150 min/wk of regular physical activity
- People with type 1 diabetes:
 - Count carbohydrates
 - Adjust insulin based on insulin-to-CHO ratios
 - Use correction factors



In the “Real” World

- Facilitate behavior changes that individuals are willing and able to make based on proven lifestyle interventions
- A variety of nutrition therapy interventions and eating patterns can be implemented
- But lifestyle interventions for diabetes are effective!

Diabetes and Nutrition Resources

Joanne Gallivan, MS, RD

Director, National Diabetes Education Program

National Institute of Diabetes and Digestive and Kidney Diseases

National Institutes of Health



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NDEP Resources

Diabetes HealthSense

Resources for living well

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Diabetes HealthSense provides easy access to resources to help you live well and meet your goals—whether you have diabetes or are at risk for the disease.

Live well. Eat healthy. Be active.
It's not easy, but it's worth it.

Use the options on the left to find resources to help you get started.

Search HealthSense by title or keyword

The Health Improvement Institute recently named NDEP as the recipient of its 2012 Annual Aesculapius Award, recognizing NDEP's Diabetes HealthSense website for excellence in the communication of reliable information about healthy lifestyles, disease prevention, and health care treatments. [Read more](#)

Make a Plan

Change begins with just one step. Make a plan to achieve your goals.

Health Care Professionals

Find research articles and resources for facilitating behavior change in your practice.


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Healthy Eating with Diabetes

Making changes in the way you eat can be difficult. Learn about small steps for healthy eating to help you manage your weight.



1 2 3 4 5

www.YourDiabetesInfo.org/HealthSense



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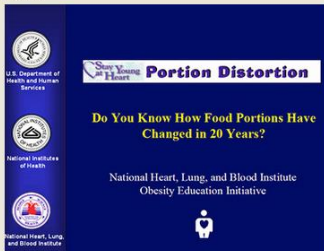
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Featured Resource


[Portion Distortion](#)

These quizzes will test your knowledge about how today's portions compare to the portions available 20 years ago and the amount of physical activity required to burn off those extra calories.

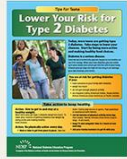


From: National Heart, Lung, and Blood Institute (NHLBI)

Related Publications




The HEALTHY Study



Tips for Teens: Lower Your Risk for Type 2 Diabetes

Make a Plan


Change begins with just one step. Make a plan to achieve your goals.




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Find research articles and resources for facilitating behavior change in your practice.

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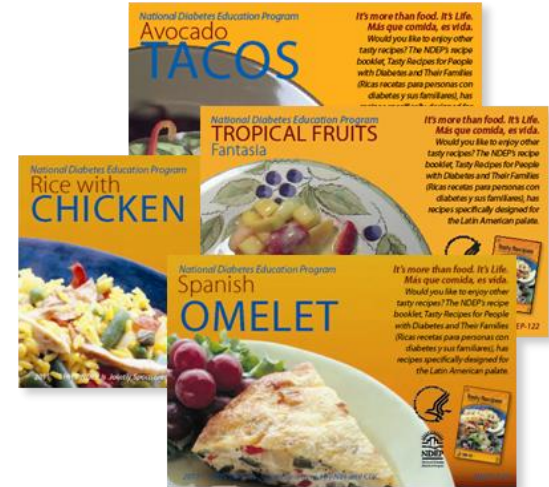
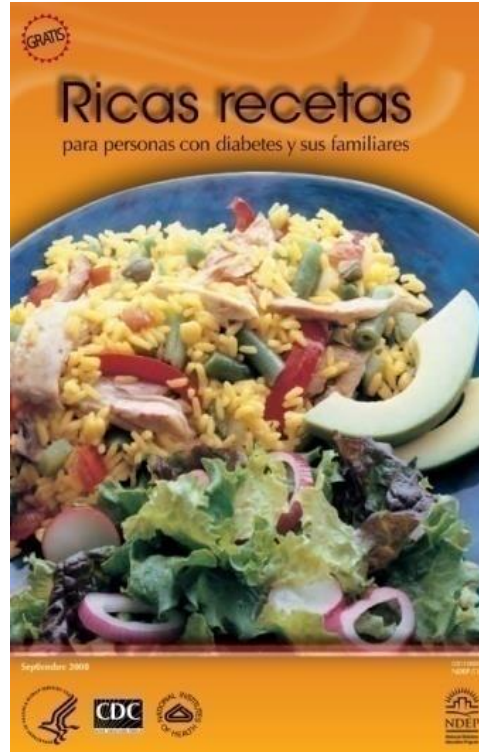
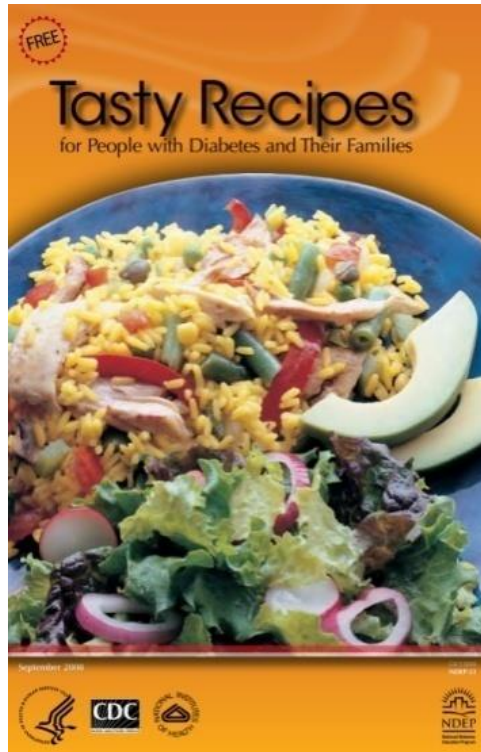
A Healthier You	This easy-to-use resource guide helps you make smart choices from every food group, find balance between food and physical activity, and get the most out of the calories you consume.	Department of Health and Human Services (HHS)
America on the Move  Registration Required	America on the Move is an evidence-based nonprofit dedicated to helping you take small steps and make small lifestyle changes for a healthier way of life. This website will help you improve your health and quality of life through healthful eating and active living. Includes an online community, articles on making healthy choices, and more. En español	America on the Move (AOM)
American Sign Language Diabetes Video: Dr. Chris Moreland	This online workshop video presents a broad overview of diabetes in sign language, including pathophysiology, risk factors, management techniques, and preventative measures.	NorCal Services for Deaf and Hard of Hearing
BAM! Body and Mind	This website gives kids ages 9 to 13 the information they need to make healthy lifestyle choices. The site focuses on topics that are important to them—such as stress and physical fitness—using kid-friendly lingo, games, quizzes, and other interactive features. The Teacher's Corner provides interactive, educational, and fun activities that are linked to national education standards for science and health.	Centers for Disease Control and Prevention (CDC)



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NDEP Resources



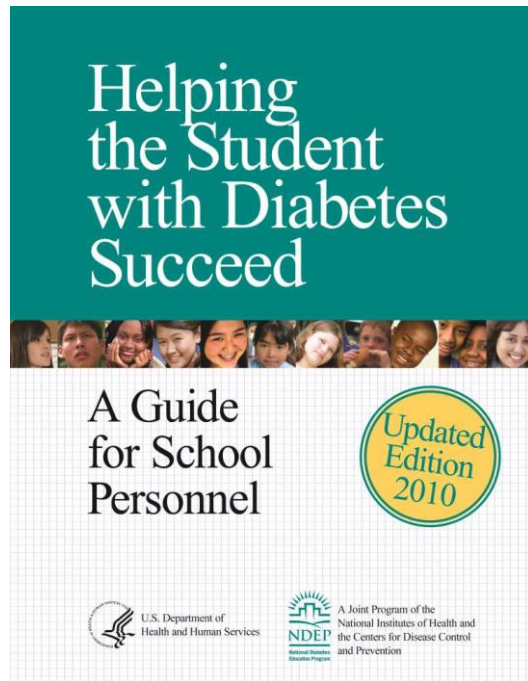
Tasty Recipes for People with Diabetes and Their Families
For more information, call 1-800-CDC-INFO or visit www.cdc.gov/info



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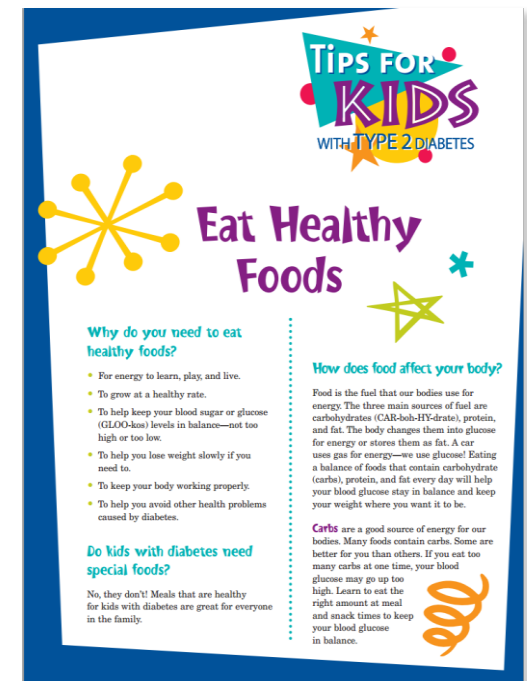
NDEP Resources for Schools and Youth



Helping the Student with Diabetes Succeed: A Guide for School Personnel



Tips for Teens with Diabetes: Make Healthy Food Choices



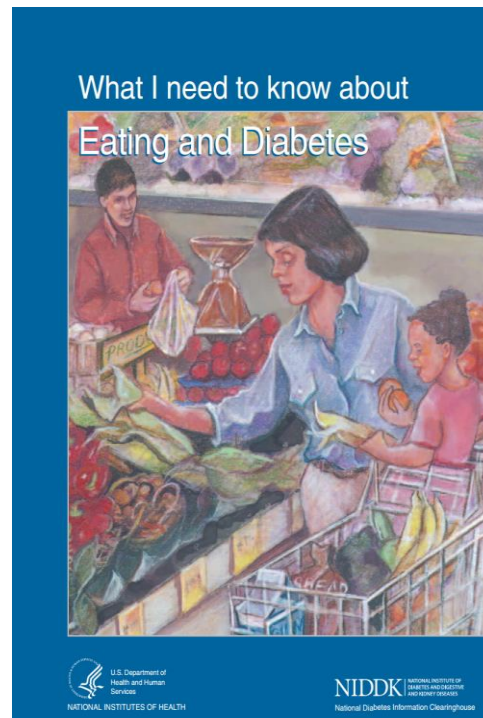
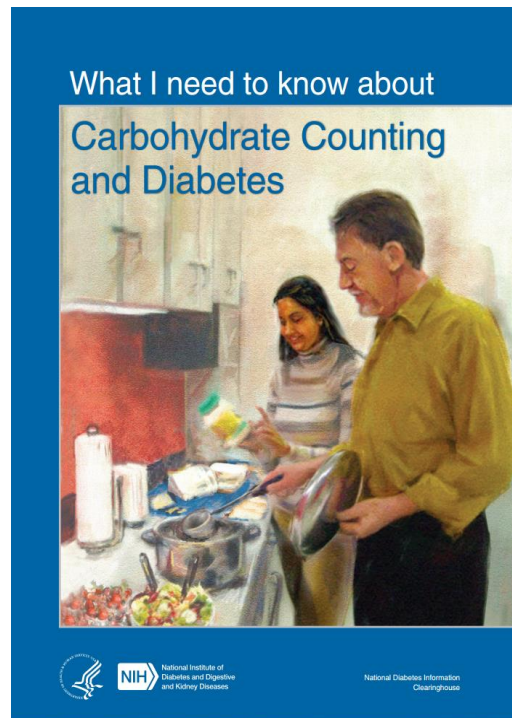
Tips for Kids: Eat Healthy Foods



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National Diabetes Information Clearinghouse (NDIC)



<http://diabetes.niddk.nih.gov/>





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Resources from the National Kidney Disease Education Program




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**NKDEP** National Kidney Disease Education Program

**NIDDK** NATIONAL INSTITUTE OF DIABETES AND DIGESTIVE AND KIDNEY DISEASES
at the National Institutes of Health

Improving the understanding, detection, and management of kidney disease.

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CKD and Nutrition for Dietetic Educators


NKDEP has developed a suite of materials to support dietetic educators in teaching students and interns about nutritional interventions for chronic kidney disease (CKD) patients. The materials are designed to provide students and interns with the basic information they will need to counsel patients who have CKD once they become practicing registered dietitians (RD). The dietetic educators materials suite includes a presentation, *Chronic Kidney Disease 101: Nutrition Intervention*, which covers kidney function, kidney disease, and basic information about the CKD diet in the outpatient setting. Additionally, the suite includes four outpatient case studies, which challenge students to think critically about nutritional interventions and apply their CKD nutrition knowledge. The case studies feature patients with a variety of kidney-related conditions; including hypertension and prediabetes, albuminuria and type 2 diabetes, and several CKD complications.

CKD & NUTRITION

- Overview
- CKD Nutrition Management Training Program
- CKD and Nutrition for Dietetic Educators**

**NKDEP** National Kidney Disease Education Program

Make the Kidney Connection Food Tips and Healthy Eating Ideas



Diabetes and high blood pressure are the two leading causes of kidney disease. Other risk factors include heart disease and a family history of kidney failure. Eating healthy is one way to maintain good health. Small changes to your diet can help you manage your diabetes and high blood pressure and possibly protect your kidneys.

The National Kidney Disease Education Program (NKDEP) and National Diabetes Education Program (NDEP), both of the National Institutes of Health, have a few tips to get you on your way to healthier eating!

Tips on How to Eat Less

1. Make sure you eat breakfast every day.
2. Share a single dessert.
3. When eating out, have a big vegetable salad, then split an entrée with a friend or have the other half wrapped to go.
4. Drink a glass of water 10 minutes before your meal to take the edge off your hunger.
5. Listen to music while you eat instead of watching TV (people tend to eat more while watching TV).
6. Eat slowly. It takes 20 minutes for your stomach to send a signal to your brain that you're full.
7. Teaspoons, salad forks, or child-size utensils may help you take smaller bites and eat less.
8. Make less food look like more by serving your meal on a salad or breakfast plate.
9. Make a list before you go to the store. Don't grocery shop on an empty stomach.
10. Try not to snack while cooking or cleaning the kitchen.

Continued on the next page.

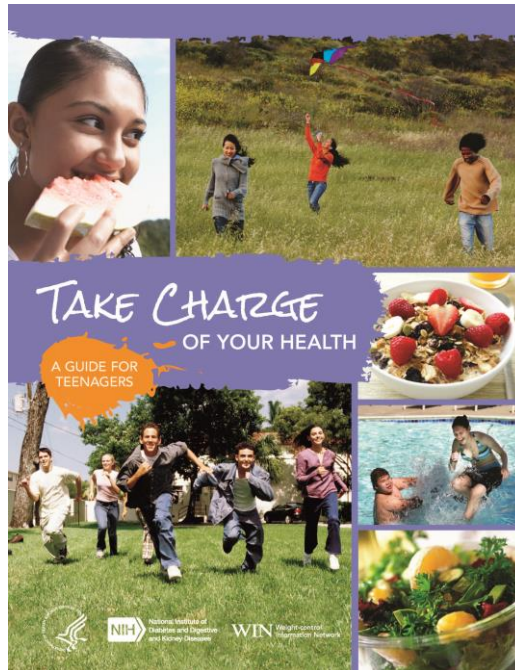
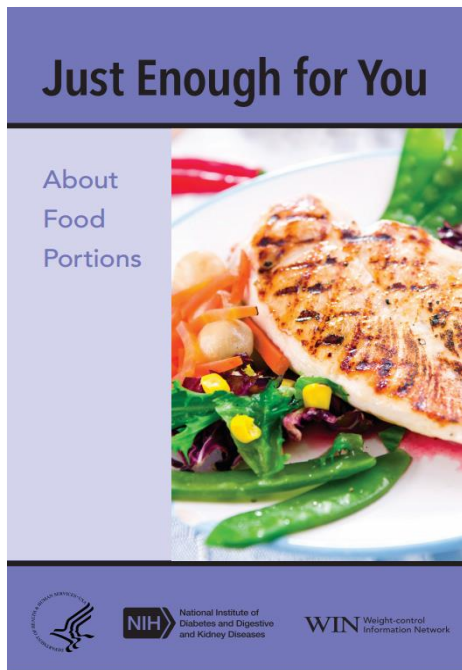
<http://nkdep.nih.gov/>



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Resources from the Weight-control Information Network (WIN)



<http://win.niddk.nih.gov/>



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Partnership with the Academy of Nutrition and Dietetics (AND)

- NDEP celebrates March as National Nutrition Month
- AND's DCE practice group co-brands and distributes NDEP patient education materials
- **Coming Soon:** Diabetes and Kidney Disease webinar featuring Dr. Andrew Narva, Director of NKDEP on May 20, 2014 at 1PM ET



www.eatright.org



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Webinar Slides and Evaluation

- Webinar Series Webpage
 - <http://ndep.nih.gov/resources/webinars>
- Presentation Slides
- Webinar Evaluation
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Questions and Answers



Thank you!



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